



## Supplementary materials

# Thermal Analysis of Metal-Organic Precursors for Functional Cu:NiOx Hole Transporting Layer in Inverted Perovskite Solar Cells: Role of Solution Combustion Chemistry in Cu:NiOx Thin Films Processing

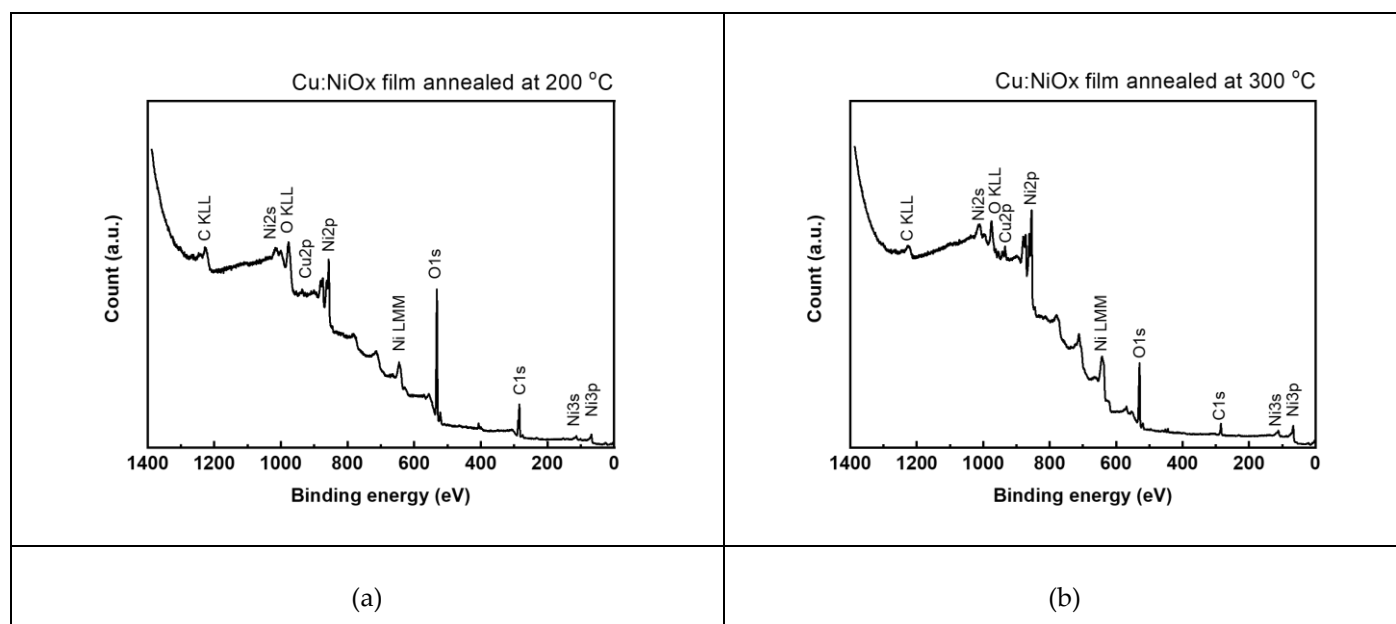
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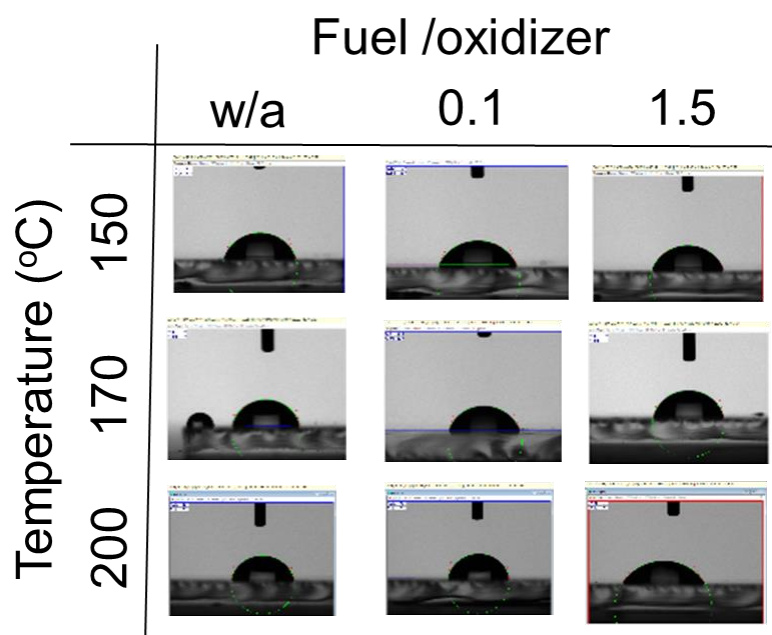


**Figure S1.** XPS survey spectra of the Cu:NiOx films fabricated from precursor containing 0.1 Acac and annealed at (a) 200 °C and (b) 300 °C.

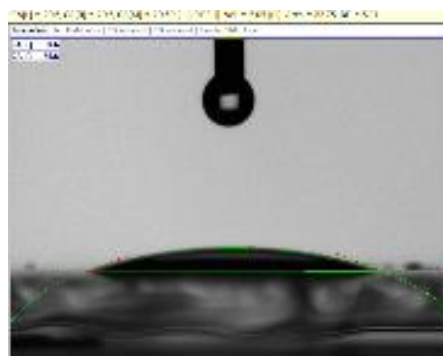
**Table S1.** XPS calculated atomic ratios for the Cu:NiOx films fabricated from precursor containing 0.1 Acac and annealed at 200 and 300 °C.

Sample	C <sup>[a]</sup> (%)	N <sup>[b]</sup> (%)	Ni (%)	Cu (%)	O (%)
200 °C annealed Cu:NiOx film	18.40	8.05	17.59	2.10	53.86
300 °C annealed Cu:NiOx film	3.26	1.45	42.11	5.22	47.95

<sup>[a]</sup>C-oxygen/nitrogen bonded species corresponding to a 6.51 and 0.64 wt.% content for 200 and 300 °C annealed Cu:NiOx films, respectively. <sup>[b]</sup>Nitrogen-containing species corresponding to a 3.32 and 0.33 wt.% content for 200 and 300 °C annealed Cu:NiOx films, respectively.



**Figure S2.** contact angle picture of water on films prepared using precursor containing w/o, 0.1 and 1.5 molar ratio of fuel (Acac) to oxidizer (Cu, Ni nitrates) annealed at 150, 170 and 200 °C, respectively.



**Figure S3.** contact angle picture of water on films prepared using precursor 0.1 molar ratio of fuel (Acac) to oxidizer (Cu, Ni nitrates) annealed at 300 °C showing an angle of 20°.